

Patent claims

1. Method for manufacturing injection-moulded plastic products, in which method an IM film is used, which travels continuously through several steps known as such, in which the IM film is processed so that a desired image, text or other such
5 desired design can be achieved onto it, **characterised** in that the processed IM film is directed to the injection moulding process, in which the product and the IM film are combined, after which the combination is transferred to a platform or, for example, directly to the assembly line of mobile phones in an integrated upgrading system.
- 10 2. Method according to claim 1, in which plastic products are manufactured, for example, for the following devices: mobile phones, game consoles, press buttons, keyboards, sockets, wrist watches, clocks in general, suitcases, attachea cases, document cases, trays, sports equipment, such as frisbee, skateboard, snowboard, consumer goods in general, furnishing parts for cars, furnishing parts for aeroplanes,
15 **characterised** in that the different work processes have been combined as an integrated part to the injection moulding process and that all steps have been synchronised with each other.
- 20 3. Method according to claim 1 or 2, **characterised** in that the steps comprise, among others, the piezo printing/laser printing method, laser engraving method, the hardening method of UV colour/paint, vacuum methods, deep drawing or some other formatting method of the IM film, injection moulding method, vacuum metallisation, laser cutting, painting/lacquering with piezo sprays.
- 25 4. Method according to claim 1, 2 or 3, **characterised** in that all work processes are digitally controllable.
5. Method according to one of the preceding claims, **characterised** in that the design and formation of the image, surface is conducted digitally.
6. Method according to one of the preceding claims, **characterised** in that the manufacture and all the work processes are directly controllable by means of the Internet.
- 30 7. Method according to one of the preceding claims, **characterised** in that the IM film is clean.

8. Method according to one of the preceding claims, **characterised** in that the IM film is continuous and that it simultaneously forms a conveyor.
9. Method according to one of the preceding claims, in which the deep drawing or overpressure process is used in the 3d formatting, **characterised** in that the IM film is directed, aligned on mechanically moving auxiliary surfaces/planes.
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10. Method according to one of the preceding claims, **characterised** in that the IM film is formatted before the injection moulding step and that the vacuum processes are directed to a finished 3d formatted IM film before the injection moulding process.
11. Method according to one of the preceding claims, in which vacuum metallisation has been combined to the production process e.g. for screening, **characterised** in that the work process is performed to the inner surface of the workpiece after the injection moulding process.
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12. Method according to one of the preceding claims, **characterised** in that the removal/detachment of the workpiece from the IM film, which forms the conveyor as the end of all work processes, is conducted by a laser work process.
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13. Method according to one of the preceding claims, **characterised** in that the workpiece is detached from the IM film part by a laser method, and that the workpiece has been placed to a work plane, which is at least biaxial x,y or triaxial x, y, z
20 so that the laser beam would always align correctly.